**Honors Conceptual Physics Kinematics Practice   
ANSWER KEY**

1. In a graph of distance vs. time, what does the slope of the line equal?
   1. the slope of the floor
   2. distance traveled
   3. total time
   4. velocity
   5. acceleration
2. In a graph of velocity over time, what does the slope of the line equal?
   1. Velocity
   2. Distance
   3. Total time
   4. Acceleration
3. In order to find the distance travelled in a velocity over time graph, you must
   1. Find the slope of the line
   2. Divide the area into triangles and rectangles to find the area
   3. Add up the vertical axis numbers
   4. None of the above
4. The position time graph pictured below represents the motions of two objects, A and B. Which of the following statements concerning the objects’ motion is true? You may choose more than one answer. (3 points)
   1. Object B travels the greater distance
   2. Object A has the greater velocity
   3. Object A leaves the reference point at the earlier time
   4. Both objects have travelled the same distance when they cross
   5. Object A is travelling for a longer period of time
5. For the objects shown in the graph, which is fastest?

distance

(m)

time (s)

0 1 2 3 4 5

5

4

3

2

1

0

B

C

A

LINE A

1. Say you want to ride your bike to Olney, Maryland. If Olney is 48 km from your house, and you can average 16 km/hr on your bike, at what time do you have to leave to arrive at noon?

9:00 am

1. What is the average velocity of a car that goes 120 m in 20 seconds?
   1. 120 m/s
   2. 0.17 m/s
   3. 2,400 m/s
   4. 21,400 m/s
   5. 6 m/s
2. What is the average velocity of someone who walks 3 km in a half hour, then 3 km in an hour, then 6 km in an hour and a half?

4 km/hr

1. If a bicyclist averages 10 m/s, how far will he/she go in 1 minute?  
    600 meters
2. The world record for the 100 m dash (running) is 9.78 s. The world record for 200 m is 19.32 s, and the world record for 400 m is 43.18 s. Which has the highest average velocity, and what is it?

100 meter dash = 10.22 meters/second  
200 meter dash = 10.35 m/s  
400 meters = 9.26 m/s

11. A car accelerates at 2 m/s2 . Assuming the car starts from rest, how much time does it need to accelerate to a speed of 20 m/s? (2 points)

*a. 2 seconds   
b. 10 seconds   
c. 20 seconds   
d. 40 seconds*e. none of the above

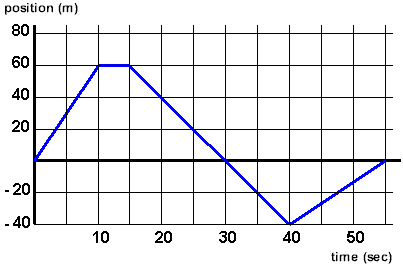
1. A ball is thrown upwards and caught when it comes back down. In the absence of air resistance, the speed of the ball when caught would be
   1. a. less than the speed it had when thrown upwards.
   2. more than the speed it had when thrown upwards.
   3. the same as the speed it had when thrown upwards. (2 points)

13. Suppose an object is in free fall. Each second the object falls (2 points)

a. the same distance as in the second before.   
b. a larger distance than in the second before.   
c. with the same instantaneous speed.   
d. with the same average speed.   
e. none of the above

14.

1. In the distance over time graph below, where is the object at 40 seconds?

40 meters beyond home

1. What was the object’s average velocity from 15 to 40 seconds?

-4 m/s

What was the object’s velocity from 0 to 10 seconds?

6 m/s

1. What is happening from 40 seconds to 55 seconds?

Going back home

1. How far did the car travel altogether (not displacement!).

200 meters

1. A car speeds up from rest to 50 m/second in 20 seconds. What is its acceleration?

2.5 m/s/s

1. .A baseball is thrown vertically with a speed of 20m/s. How long does it take the ball to reach maximum height? Ignore air currents and air resistance. (4 points) Show your work.

2.04 seconds

1. In problem 20 above, how far up does the ball travel? Show your work. (4 points)

x = ½ a t^2 = ½ 5 x 2.04 x 2.04 = 10.4 meters

1. How long would it take a car, starting from rest and accelerating uniformly in a straight line at 5 m/s2, to cover a distance of 200 m ? Show your work for full credit. (4 points)
2. x = v**i** t + ½ a t**2** 200 = ½ 5 t**2** t**2** = 80 t = 8.9 seconds